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ABSTRACT

This issue, number 33 in the series, is divided into the sections of: (1) British science education activities, and (2) overseas and international science education activities. Presented in a newsletter format, topics include the following: teacher education projects, teaching science to less motivated pupils, college science curriculum, out of school science activities, use of electronic calculators in school mathematics, and news of various mathematical and science associations throughout the world. (SL)

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Science Education Newsletter

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May 1977

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SCIENCE EDUCATION RESEARCH IN THE UNITED KINGDOM

Prior to 1967 there were no senior appointments designated specifically to the field of Science Education in Universities in the United Kingdom. Now 10 years later there are almost a dozen or so at Professor or Reader level. This recognition to science education has been occurring during a period when not only has there been an unprecedented concern for and study of the curriculum but also a substantial increase in related research.

At a recent seminar (see SEN 32.22) sponsored by the Council of Europe in co-operation with the Institute for Science Education (IPN) at the University of Kiel (Malente, October 1976) a survey of science education research was undertaken by Professor Kevin Keohane, Rector of the Roehampton Institute, London, and formerly Director of the Centre for Science Education, Chelsea College, London. Member countries submitted national reports from which the overall progress in this research was distilled by Dr Keohane. A very comprehensive report of the submissions and discussion will be published later in 1977 in English as follows:

Frey, K; Blaensdorf, K; Kapune, Th; Schaefer, G; (Eds):
Research on Science Education in Europe
Lisse/Netherlands 1977 (Swets).

Meanwhile Dr Keohane has provided a summary of his own report on Progress in Research in Science Education in the United Kingdom.

It is clear that from the volume of output and the financial investment, the United Kingdom is among the leaders in Europe in this field. The various research interests can be broadly grouped into:

1. curriculum development
2. psychological studies applied to learning in science
3. sociological studies applied to education in science
4. research in teacher education
5. adult learning in science
6. science related to society
7. educational technology related to science education

Of these, Curriculum development undoubtedly constitutes the most significant area of research although it would be true to say that the emphasis has been changing during the past few years. It is interesting to reflect on the style of this development which has not relied heavily on a theoretical base. Indeed it has been said that curriculum theory has often been marked by a confusion which has inhibited curriculum design. Peel writing in the 1960's doubted whether educational theory before that time could have contributed much to research in science education. If his view is correct, the non-involvement of educational theorists in the massive science curriculum studies of the 60's is perhaps not only explicable but understandable. However, curriculum design is now beginning to work from an improved base and the second generation of curriculum development brought in educational expertise not only for the formulation of objectives but also for more formal evaluation. The more recent third phase has seen a growth in individualisation with curriculum units being generated in a school for its own needs, or by the central production of modules for individualised choice and learning by students. Furthermore, there has been a major extension of curriculum study from schools to higher education. To name but a few there are those Nuffield studies, the Physics Interface project, Higher Education Learning Project in Physics, Science in a Social Context (SISCON), and collaborative studies in Biology, whilst others, Keller Studies at Surrey, Engineering Studies at Cambridge, Computer Curriculum Studies at Chelsea and elsewhere, all point to major developments in science education at degree level.

Psychological studies appear to have concentrated on concept development, problem solving and motivation. This is not a new phenomenon as over the years a very substantial contribution has been made by those such as Lovell at Leeds and Lunzer at Nottingham and more recently by Harlen at Reading and Shayer in Chelsea. Linguistics appears to be a field in which science educationalists are developing an interest, and it is becoming increasingly clear that a far more careful documentation is necessary if a full picture of the complete range of psychological studies applied to science education is to be known.

Direct involvement in social policy studies has not in the past been a major area of activity in the United Kingdom. However, particularly through M F Young in London and the groups at Leeds and the Open University this field is beginning to develop rapidly. Social policy studies are being reflected in the curriculum by the integration of social implications and this may well be encouraged by current interest in conservation and problems of the environment. In another direction Duckworth and Ormerod (Brunel and NFER) have been working on Attitudes to Science whilst among others Jan Harding has been concerned with sex differences in attitudes to science and science education.

Work in comparative studies was most active in the group under Lauwerys in London during the 1940's and 1950's. The work has continued under Holmes and there is also a more recent development at Oxford with J J Thompson.

Historical studies are principally related to Layton's work in Leeds, Brock's work at Leicester and Mansell's in Chelsea.

Research in Teacher Education with respect to Science has been dominated by Sutton and his colleagues' work on S.T.E.P. (Science Teacher Education Project) and more recently by Bird (C.C.S.S. College Curriculum Science Studies) who has concentrated at Primary level on college curriculum courses in science.

It appears that the United Kingdom is dominating the European scene in adult studies, primarily through the massive progress made through the Open University. Pentz and his colleagues have written widely on learning in science by correspondence, radio and television whilst more conventional adult studies are perhaps typified by the work of Frost in London. Similarly Britain is making a substantial contribution in science studies related to society. Williams' work in Leeds (SISCON) has already been referred to, and there is also major work from the Science Policy Unit at Sussex, Meadows' work at Leicester and a recent proposal for a Science and Society study at school level by Lewis of Malvern College.

Sadly a brief summary has necessarily omitted important work by many active in the field — particularly from those in Scotland who in many ways have been to the fore in realistic curriculum study. To all one can only apologise and hope that the full paper will give the true credit.

But what of the future? The past 10 years have seen remarkable progress and no country in Europe seems from the reports to be better based for even more splendid things than the United Kingdom. For this no group can claim greater credit than teachers — at all levels from the Primary School to University, College and Polytechnic. It is they who have largely prompted and taken part in this remarkable decade.

K W Keohane
1977

ACTIVITIES IN BRITAIN

1. TEACHER EDUCATION PROJECT

This four-year research and development project, funded by the Department of Education and Science, is based at the Universities of Leicester and Nottingham; it commenced in October 1976 and will run until September 1980. The Project Directors are Professor E C Wragg (Nottingham) and Dr Clive Sutton (Leicester). Its main purpose is to produce and test ideas and materials for use in the one-year postgraduate Certificate in Education course, though many of these are also likely to be applicable in the professional year of new BEd courses.

The emphasis is on classroom practice, and the Project team will be working with several groups of tutors from universities, polytechnics and colleges to develop training procedures and materials in key areas. There will be close cooperation with practising teachers engaged in the supervision of students during teaching practice.

The project is not intended to produce a PGCE 'package' for other establishments to adopt; the aim is rather to conduct enquiry, develop and test materials and ideas, and hope that these become influential.

Research and Development are both important in this Project and are proceeding simultaneously. Research enquiries will include investigation into the job of the young teacher, and studies of experienced teachers' management and control of mixed ability groups.

Evaluation of the effects of the project and its materials will be used both at the formative stage and to help future users of published items.

Areas of interest. Those of highest priority are:

- Mixed ability teaching
- Management, control, discipline
- Language in the classroom
- The supervision of school experience

Other important areas are:

- Job analysis of some aspects of the probationary teacher's role
- Teaching the gifted and less able child
- Handling learning difficulties
- Evaluation and assessment
- Counselling and pastoral care
- Using audio-visual aids
- Resource-based learning
- Productive thinking

Time Scale

- 1976-77 Early school-linked research enquiries. Formation of working groups, and production of first materials.
- 1977-78 Some field-testing of ideas and procedures. Some development of resource material, with research continuing in parallel.
- 1978-79 Major effort put into refinement and field-testing. Production of more polished versions of resource material. Extensive evaluation studies.
- 1979-80 Preparation for publication, and extension of the involvement of users in adaptation.

The tangible products of the project are likely to vary: in some cases they will be a book, teachers' handbook, pamphlet or article; in other cases, they may be videotape, film, tape-slide or graphic material. Some self-instructional study guides for students are likely to be produced.

Progress of the project so far

At Nottingham University, the following working groups of tutors have been established:

- (i) Class Management and Control
- (ii) Mixed Ability Teaching (Strategists)
- (iii) Mixed Ability Teaching (Bright children and slow learners)

These three groups have prepared a research package in which colleagues in many different institutions are asked to undertake coordinated case studies in schools.

- (iv) Teaching skills
- (v) Job Analysis: the Young Teacher's Role

At Leicester University, a **Language Across the Curriculum** group has been established.

New working groups on **assessment in schools** and the **management and assessment of teaching practice** are likely to be established later.

Further information may be obtained from the project coordinator: Mr Trevor Kerry, School of Education, University of Nottingham, University Park, Nottingham NG7 2RD.

2. LAMP PROJECT — Teaching Science to Less Academically Motivated Pupils

Over the last ten years, the number of curriculum development projects in science has been considerable, but most of the materials produced have been for pupils of average or above average ability; furthermore, the projects have been national rather than school-based developments.

In the early 1970s, with the raising of the school leaving age from 15 to 16, the problems of teaching science to pupils who lacked ability or motivation in science became more acute. In 1974, the Education (Research) Committee of the Association for Science Education set up working groups to examine ways of presenting science to less academically motivated pupils. The LAMP project which resulted has developed materials and methodology for teaching science to pupils in the 14 — 16 age range.

Topic Briefs have been produced, to provide materials for teachers working on a modular science course. These Briefs are not prescriptive, but are intended as a resource for teachers, to be used individually, in part, or as a complete course. Each unit contains notes and activity sheets for the teacher's use, and experiment and information sheets for the pupils. A teacher's Handbook describes the development of the project and its aims, with suggestions for the use of the Topic Briefs. Teachers are also given guidance for the writing of further units. The following items are available:

Topic Briefs

1. Fuels	£0.80
2. Heating and Lighting a Home	£0.80
3. Pollution	£0.70
4. Materials	£1.20
5. Photography	£0.60
6. Gardening	£0.70

Teachers' Handbook £0.75

Future topics will include: Health and Hygiene; Space and Space Travel; Paints and Dyes; Flight; Microbes and Man; Electronics; The Human Body.

Information about the project and publications may be obtained from:

The Association for Science Education,
College Lane,
Hatfield,
Hertfordshire,
AL10 9AA
United Kingdom.

3. ASSOCIATION OF TEACHERS OF GEOLOGY

This Association was founded in 1968, with the aim of promoting geology as a subject of scientific, educational and social relevance.

The Organisation, with a membership of over 1100, is well placed to influence the teaching of geology at different levels, as well as to develop a range of services for those teachers who have limited resources available to them.

The Association holds an annual weekend conference/course in September each year, which provides an opportunity for the exhibition of specimens, apparatus, written materials and teaching aids; lectures and discussions are held on topics of special interest.

A quarterly journal, "GEOLOGY TEACHING", is sent to all members. It includes articles on a variety of geological topics, reviews of books and other teaching resources, and "Shop Floor", a section reporting individual teachers' approaches to classroom and field teaching.

The Association's Primary Group provides a forum for teachers and teacher trainers interested in the 5 to 13 age range.

Membership enquiries should be addressed to:

David S Scott
Crewe and Alsager College of Higher Education
Crewe Road
Crewe
CW1 1DU.

4. TEACHING PRIMARY SCIENCE — The College Curriculum Science Studies Project (see SEN 20.8, 29.11)

Eight books in this excellent series have now been produced. They are:

Seeds and Seedlings
Candles
Paints and Materials
Science from Wood
Fibres and fabrics
Mirrors and magnifiers
Science from Water Play
Musical Instruments

Each volume complements appropriate titles in the Science 5/13 series. Scientific investigations are suggested for the non-specialist primary teacher, using simple apparatus.

Further titles in preparation are:

Aerial models
Visit to a wood
Child-generated science
Students, teachers and science: a lecturers' guide.

The books are published by Macdonald Educational, 49–50 Poland Street, London W1, price £1.50 each.

5. THE PHYSICS INTERFACE PROJECT

The Universities of Birmingham, Cardiff, Chelsea, Keele, Surrey and York, with financial support from Nuffield Foundation have combined to form a group which has produced physics materials for students at the transition point between the end of the sixth form and entering university courses. It follows that the materials in the form of objective tests and self teaching units make assumptions about prior knowledge but the essential purpose is to identify the needs of the university entrant and then to provide remedial self instruction. The idea is to bring a heterogeneous group of students to a common level of understanding in physics; thus the scheme will have applications in other teaching situations eg as supplementary materials and for revision. The materials consist of: a Resource Booklet; self-teaching units on Electricity, Mathematics, and Mechanics and General Physics; "Do it Yourself" Demonstrations; and tests.

Fuller details from the publishers, University College, Cardiff Press, POB 78, Cardiff CF1 1XL, South Wales, United Kingdom.

6. OUT OF SCHOOL SCIENCE ACTIVITIES and THE ROLE OF THE BRITISH ASSOCIATION*

The British Association for the Advancement of Science exists to provide a forum for scientists and technologists both to exchange ideas and information and to present their achievements and problems to a wider, non-specialist audience.

Since its foundation in 1831 the Association has furthered its aims mainly through its famous Annual Meeting, held in a different centre each year and attracting attendances averaging some 2,000 for a week of lectures (some 300), symposia, film programmes, field excursions, exhibitions and social events. But in a changed postwar world there was a need for continuing activity throughout the country, throughout the year, which led to the formation of branches in 1959. There are now nineteen, which organise locally Junior BA Meetings (with attendances from 2,000 – 6,000), Science and Technology Fairs (over 80 since 1961), local lecture services, special conferences and other events.

The ready response from young people to these activities led to the formation of British Association Young Scientists (BAYS) in 1968. BAYS now has a membership (rapidly approaching 10,000) of secondary school students organised in nearly seventy BAYS Branches with their own elected student committees. Branches organise lectures, visits, film shows, projects and social events. Groups of Branches in turn arrange regional events and each year a residential 3–4 day conference on a major scientific or technological topic. The BA itself publishes BAYSNEWS for members and assists in a variety of material and practical ways. Of these the most notable is the BAYS Environment Project, which involves individuals and groups of BAYS in actual current scientific or technological research. It has also been possible to sponsor some BAYS members to attend scientific conferences and camps in Britain and abroad (USA, Middle East, and Europe).

This variety of youth activity has been made possible only by support in money or voluntary effort by a wide range of individuals and organisations. It has been fostered too by the maintenance of close links between the British Association and a number of national and international organisations, each concerned with promoting the interest of young people in science and technology.

* This account is a summary of a paper presented at the Association for Science Education's Annual Meeting in January 1977 by Mr Alec M Hughes, Assistant Secretary of the British Association.

7. CONTINUING MATHEMATICS PROJECT (SEN 30.11)

This Project was established to produce self-study materials in mathematics for students beyond the statutory school-leaving age, who are not specialising in mathematics, but who need to master, or to consolidate, specific mathematical topics and techniques as a service subject to their main courses of study.

The developmental phase of the Project is now complete, and the current phase, due to end in mid-1978, is one of dissemination. The Project's materials are being used by students taking a wide variety of subjects, such as economics, biology, chemistry and geography. The materials are in use in many different kinds of institutions, including the Sixth Forms of schools, in Sixth Form Colleges, in Colleges of Further Education and Colleges of Higher Education, in Colleges and Departments of Education, in Polytechnics and in Universities. The materials are also suitable for use in distance education, such as correspondence courses.

The following Units have already been published:

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- Indices and Standard Form
- Linear Programming
- Hypothesis Testing I
- Hypothesis Testing II
- Hypothesis Testing III
- The χ^2 Test
- Correlation
- Descriptive Statistics I (including a tape/filmstrip)
- Descriptive Statistics II (including a tape/filmstrip)
- Descriptive Statistics III
- Descriptive Statistics IV
- Probability I
- Probability II
- Probability III

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- Positive and Negative Numbers
- Inequalities
- Working with Ratios
- Transformation of Formulae
- Using Logarithms to Determine Relationships
- Theory of Logarithms I
- Theory of Logarithms II

The following Units have been written but are not yet published:

- $y = mx+c$
- Trigonometry of the Right Angled Triangle
- Computation with Logarithms I
- Computation with Logarithms II
- Mathematics in Geography I
- Mathematics in Geography II
- Mathematics in Geography III
- Mathematics for Biologists I
- Mathematics for Biologists II
- Trigonometry of the General Triangle
- An Introduction to Trigonometrical Graphs
- An Introduction to Sets
- C — Calculation and Use
- n r
- Flow charts and Algorithms
- Critical path analysis

Further critical path analysis
Systems
Information and Coding I to IV
Elementary Calculus I to V
Parametric Statistics I to VI

At this level, it is thought that the material is of potential use in a wide variety of educational and cultural circumstances, and considerable interest has been shown in other countries, particularly in Australia, in the material. Further information can be obtained from the Project: Continuing Mathematics Project, Mantell Building, University of Sussex, Falmer, Brighton BN1 9RF, Sussex. The materials themselves are being published by Longmans, and will be available from Longman Group Resources Unit, 9/11 The Shambles, York.

8. SMP 7-13

The School Mathematics Project is well known for its texts and cards for secondary school mathematics. March 1977 saw the publication of the first unit of SMP 7-13. This is a new course catering for an age range lower than that for which SMP have previously catered. Preparation of this course started in 1972 and it has been written by teachers, tried and revised and only now is offered to a wider public.

By the provision of pupil work cards and supporting Teachers' Guide and Recording Systems the Project offers to children between 7 and 13 (or thereabouts) a carefully structured and sequential course of study. The course is largely individualised and it should be suitable for a wide spread of ability, particular care having been paid to the language used in the cards.

The SMP writers are aware that many teachers of this age group are not specially qualified in mathematics and have thus provided a systematic course in the subject. Particular attention has been paid to the development of number work — though this is not the whole of the mathematical content of the course! Little "new" mathematics is introduced — the course utilises mathematics which represent the best of what most schools are already teaching. There are no special requirements for apparatus beyond that found in most schools already.

The first two units of the course (for children between 7 and 9) are now available on attractively produced durable cards and the remainder will be published at intervals up to 1980. An *Inspection Booklet* (SMP 7-13 Inspection Booklet) giving much more detail about the course has been prepared for teachers who wish further information. The booklet shows how the course develops and provides specimen cards. The *Booklet* is available on request from Cambridge University Press, PO Box 82, London NW1 2DB.

9. THE USE OF ELECTRONIC CALCULATORS IN SCHOOL MATHEMATICS

The place of calculators in the learning of mathematics at all school levels is a matter of current debate in Britain. The School Mathematics Project (SMP)'s 'Computing in Mathematics' group is giving it considerable attention, working in particular through six schools in which the mathematics teachers are paying close attention to aspects of the use of calculators that may threaten children's numeracy. These teachers are also attempting to establish guidelines for the sensible use of calculators in schools.

There is a class set of machines (four functions, square root, memory and % key) in each school, and a member of the SMP Computing in Mathematics group available to offer and collect information and advice. The investigation is planned initially to run for a year. The major work is to examine how the machines can aid the curriculum and also how they make possible new approaches or even new topics.

The investigation is only the latest task of the SMP Computing in Mathematics group. A number of books and materials have been published in the past few years — for example, the *Teacher's Companion: 11 to 16*, a general discussion of the use of computers in maths teaching and discussion of their application in particular areas.

The latest work, due for publication early this year, is *COMPACT* — Computer Orientated Mathematics Package. This differs from other SMP computing publications in that it is pupils' material. The package has four sections:—

First steps in programming — a simple programming course suitable for 11 year-olds onwards, produced as Spirit Duplicator Masters;

Preliminary pack — a set of work cards reinforcing at each stage the programming skills developed in "First steps in programming";

Main pack — resource pack of work cards, each aimed at aiding understanding of mathematical topics by using a calculator or computer;

Extension pack — the first cards in this pack provide a course in BASIC programming language, the remaining cards are on mathematical topics suitable for use in the 14 to 18 year-old range.

COMPACT emphasizes maths rather than computing and even when dealing with programming techniques uses every opportunity to increase mathematical competence and understanding. Although written for a computer, many of the cards can be used with a calculator and others are easily adapted for this purpose. This is clearly indicated in the index in the teachers' guide, which also cross refers the cards to current SMP texts.

10. MIXED ABILITY TEACHING IN MATHEMATICS

The teaching of mathematics to mixed ability groups is a controversial issue about which much has been written and said. The recent document "An appraisal of problems in some key subjects by HM Inspectorate" mentions that in some cases problems have been accentuated by the decision to adopt mixed ability teaching for mathematics. The mathematics committee of the Schools Council has been aware that the problems of teaching mathematics in a mixed ability class are sufficiently distinctive to merit special study. With this in mind in April 1976 they set up a working group to carry out a one year survey of current practice and to produce a report which they hope to issue later this year.

To introduce the results of its work the working party will hold a residential weekend in Birmingham, September 9-11, 1977. The conference will be specially designed for mathematics advisers, curriculum development officers, heads and teachers who might be concerned in an advisory role in their own areas and schools, and others who are in a position to initiate and support local development work. Of course, teachers not so immediately concerned would nevertheless find the study weekend of interest. Full details are available from Mrs J A Denyer, The Schools Council, 160 Great Portland Street, London W1N 6LL. Further information on the work of the group may be obtained from the Secretary/Writer, 56 Woodland Lane, Leeds LS7 4PD.

11. MATHEMATICS FOR NON-SPECIALIST SIXTH FORMERS: A RESEARCH PROJECT

In the contemporary sixth-form, many non-mathematics specialists find they require some mathematical studies. These students should develop a broadly interpreted level of numeracy consistent with their general educational attainment.

To meet this need, all but one of the fourteen Regional Examination Boards in England and Wales are offering pilot Certificate of Extended Education (CEE) level examinations in mathematical studies in 1977. Of these syllabuses, a considerable number are intended for pupils whose previous attainment in mathematics has been low. There are also a few which can be used as 'O' level extension courses in particular mathematical fields according to the options chosen.

In September 1976 a BP (British Petroleum) fellowship was established to research, write, develop and evaluate teaching material, methods and assessment techniques for 16-19 year old pupils/students who, before the sixth form, indicated little interest or ability in mathematics. The brief involves teaching as well as developing materials.

The holder of the fellowship, R A B Allen, is based at the United World College of the Atlantic. The sixth-form boys and girls at this college all study mathematics to prepare for their International Baccalaureate Diploma, which qualifies them for university.

The first of the fellowship's project papers outlines the background to this project, and indicates briefly the possible manner of its progress and ways in which it can be of service to mathematics teachers.

All correspondence and requests for copies of the project paper should be addressed to the BP Research Fellow, United World College of the Atlantic, St Donat's Castle, Llantwit Major, South Glamorgan, CF6 9WF.

12. **THE MATHEMATICAL ASSOCIATION** held its Annual Conference for 1977 at Liverpool University in April. The Conference was dominated by the twin issues of the National Debate on Education and the arguments over the organisation and assessment of sixth form education. Three survey papers on topics of mathematical interest were also presented. At the AGM it was announced that **Professor Geoffrey Matthews** would be **President** for the coming year. The next Conference will be in Bath from 5/8 April 1978. Overseas visitors with a mathematical interest would, as usual, be welcome as visitors to the Conference. Further details from the office of the Association:—

259 London Road
Leicester
LE2 3BE.

13. THE ASSOCIATION OF TEACHERS OF MATHEMATICS' ANNUAL CONFERENCE, 1977 (SEN 32.14)

The Association held its Annual Conference at Trent Polytechnic, Clifton, Nottingham, from 12-16 April 1977.

Among a wide variety of themes and activities, two had particular relevance to the current national debate on the state of education in Britain. The first was a large working group devoted a consideration of arithmetic at the lower secondary school level. Another large group considered the proposals submitted by the Association for a sixth form mathematics

programme based on Investigations in mathematics, to be included in the N and F structure of examinations presently under consideration.

Much discussion also took place about the best use of pocket calculators in the teaching of mathematics at all school levels. The Association is sponsoring some small-scale research on this.

Further information about the work of the Association may be obtained from the ATM office, Market Street Chambers, Nelson, Lancashire BB9 7LN.

14. PUBLICATIONS

14.1 Force and Energy 320 pages

Atoms and Waves 213 pages

Secondary Science Series edited by L J Campbell and R J Carleton published by Routledge and Kegan Paul.

These two books provide a course of physics study for 13 to 16 year old children in Britain. The course itself builds on the previously published Foundation Science, a two year course formerly called Common Core Science. The combined courses provide for the CSE examination and the modern topics of the GCE examination. There are parallel books in the Secondary Science Series providing two year courses in biology, general science and chemistry.

The two physics volumes are written by groups of practising teachers in Britain and as one would expect, the predominant emphasis is on experimentation with basic equipment, which includes some of the Nuffield physics items.

An element of discovery is provided by "test your understanding" questions which are very useful for the inexperienced teacher and will help him to elaborate on the results of the students' experiments. The teacher will also find valuable assistance derived from the detailed practical instructions which accompany the general descriptions.

The presentation of the course is accompanied by clear and large drawings, particularly in the Light section and there are useful appendices about symbols and SI units, for example.

These books will provide a useful background for the inexperienced secondary physics teacher assisting him in the enrichment of his teaching by additional experimental work and utilising the results to establish the scientific concepts which are described.

14.2 Longman Secondary Science Series — Editor Hilda Misselbrook

This series complements the background books produced by the Nuffield Secondary Science Project. The books are written by authors closely associated with the development and spirit of the Project, and edited by its Organiser.

The series is designed for pupils in secondary schools between the ages of 13 and 16, of a wide ability range, who have not had any specialised scientific training.

About fifty titles are planned to develop the topics contained in the Nuffield Secondary Science Themes.

The first titles to be produced are:

Food Preservation, by Dorothy Dallas	£0.50p
Food as Fuel, by Dorothy Dallas	£0.50p
Vitamins and Mineral Salts, by Dorothy Dallas	£0.55p
Diabetes, by Dorothy Dallas	£0.55p
Moving through Air and Water, by J Duffy	£0.57p
Using the Cathode Ray Oscilloscope, by E Howard	£0.55p
Volcanoes and Earthquakes, by R Leigh	£0.57p

Publications are obtainable from:

Longman Group Ltd
Longman House
Burnt Mill
Harlow,
Essex, CM20 2JE.

14.3 A Safety Handbook for Science Teachers. Second Edition — K Everett & E W Jenkins. Published by John Murray, Price £2.60 (see SEN 24.22.11)

The first edition of this valuable handbook appeared in 1973. It has now been revised and enlarged, and takes full account of the Health and Safety At Work Act of 1974.

As before, the material is organised under the headings: Safety in Laboratories and Workshops, Biological Hazards, Fire, First Aid, and the Teacher and the Law. Within these there are new sections on laboratory sinks, poisons, cancer hazards, handling chemicals, hazards in plastic and polymer materials, aerosols, eye shields, dark rooms, noise, micro-biological hazards, using pupils as experimental subjects, first aid kits, and the legal liabilities of student teachers.

There are many additions to the bibliography, and the appendix now lists all the major hazards reported in the School Science Review from 1919 to 1976.

14.4 Physics Investigations by V W Bolton, published by A Wheaton & Co, Price £1.15 (No SB 10 0802 0481.3)

The Nuffield A-level physics and physical science courses have precipitated a reorientation of 6th form practical work objectives which require the use of discovery projects and investigations.

Although this aspect is not an exclusive property of the courses, the present book meets a need in providing 200 examples of this kind of open-ended practical problem work in 6th form physics courses. Some of the examples are derived from Bolton's "Physics Experiments and Projects" and the student is required to evolve procedures, design apparatus, and consider his results.

Some introductory notes for the teacher and student describe group work in the laboratory and how to tackle an investigation there. There are many explanatory line drawings.

This is essentially a source book which can be used to enrich standard teaching and will find additional applications in undergraduate physics and engineering science courses.

14.5 Osmiroid Centric Electricity Kit

This kit produced by E S Perry Ltd is a simplified version of the familiar Nuffield Science Electricity kits which are already in wide use. In this case, the contents are quite simple and inexpensive, consisting of a lego type base board which accepts square cubes and these carry the components of electrical circuits.

The components of the kit are very simple, consisting mainly of small pieces of iron and copper, with copper and resistance wire mounted on cards, and the familiar battery bulb holder. There are also festoon bulbs included and the connections are made via simple spring terminals.

With this simple equipment 7 to 13 year olds can be taught the fundamental concepts of electricity, for example: a. simple circuits and switches, b. conductors and insulators, c. series and parallel circuits, d. the concept of resistance, e. electro-magnets. The circuits require a 6 volt battery source, or failing this, a 3 volt supply.

Further details about the cost of the Centric Kit and the work cards which accompany the materials can be obtained from E S Perry Ltd, Osmiroid Works, Gosport, Hampshire, England PO13 0AL.

14.6 Chemistry Cassettes, edited by P Groves. Published by Educational Techniques Study Group of the Chemical Society, London. (see SEN 30.13.6)

The following cassettes for sixth form and undergraduate chemistry students are now available:

CC1 HEAVY METALS AS CONTAMINANTS OF THE HUMAN ENVIRONMENT
by Derek Bryce-Smith, price £4.75, running time: 100 mins.

CC2 SOME ASPECTS OF THE ELECTROCHEMISTRY OF SOLUTIONS
by Graham Hills, price £3.80, running time: 34 mins.

CC3 SOME ORGANIC REACTION PATHWAYS
by Peter Sykes, price £4.25, running time: 68 mins.

CC4 SYMMETRY IN CHEMISTRY
by Sidney Kettle, price £5.75, running time: approximately 107 mins.

These titles are in preparation, and will be published in mid-1977:

AN INTRODUCTION TO NMR SPECTROSCOPY, by Bruce Gilbert and Richard Norman.

SOME REACTION PATHWAYS OF DOUBLE BONDS: (i) C = C, (ii) C = O, by Peter Sykes.

Each cassette includes a variety of questions and problems, and is accompanied by a comprehensive booklet.

Chemistry cassettes are now in use in many countries, including Australia, Canada, Fiji, Hong Kong, India, New Zealand, Singapore, USA, Venezuela, Zambia and a number of European countries. Orders should be sent to:

The Publications Sales Officer
The Chemical Society
Black Horse Road
Letchworth
Herts SG6 1HN

14.7 A Sample Scheme for Independent Learning in Organic Chemistry

This scheme is based on the Nuffield 'A' level introductory organic chemistry topic. It was written to provide an alternative, individual approach to learning organic chemistry which might provide a better solution to the problem of teaching large 'A' level groups of mixed background, ability, motivation and ultimate use for their chemistry.

The scheme allows each pupil to work independently at his own pace from a pupils' study guide to be used in conjunction with the Nuffield Advanced Chemistry Students Book 1.

Each section of the pupils' study guide consists of an introduction, the text, which includes questions, problems; experiments; a summary and references to other resource materials. A self-assessment test is marked by the teacher at the end of four sections allowing the pupils' progress to be followed and misconception identified.

The scheme was carefully constructed on the basis of classroom experience, valid theories of learning and in consultation with teachers of chemistry in both schools and universities. It should provide a useful alternative for the Sixth form teacher who is disenchanted with the class teaching approach.

Copies of the pupils' study guide are available at 30p each plus postage and packing. Cheques should be made payable to:

Thames Valley Chemistry Centre

Further details are available from:

Dr M J Hudson
Department of Chemistry
University of Reading
Whiteknights
Reading RG6 2AD, Berks.

14.8 Studies in Science Education, Volume 4

The fourth in this series of annual reviews of research and critical issues in science education, edited by Professor David Layton, is now available.

Articles

- | | |
|---|---|
| Colin Power
(University of Queensland) | A critical review of science classroom interaction studies |
| Sally A Brown
(University of Stirling) | A review of the meanings of, and arguments for, integrated science |
| N J Entwistle
(University of Lancaster) | Choice of science courses in secondary schools: trends and explanations |
| D Duckworth
(National Foundation for Educational Research) | |
| Brian Holmes
(University of London) | Science education: cultural borrowing and comparative research. |

Research Notes

- | | |
|---|---|
| Pinchas Tamir
(Hebrew University, Jerusalem) | A note on cognitive preferences in science. |
|---|---|

Theses and dissertations submitted for higher degrees 1975-76.

The Amos de - Shalit Science Teaching Centre in Israel, 1967-1977.

Book Reviews

- | | |
|-----------------------|------------------------------|
| Sir Frederick Dainton | The Cat out of the Bag |
| P J Black | Pupils' attitudes to Science |

Volume 4 is available, price £3.00 (\$US8.00) from:

The Business Manager
Studies in Science Education
Centre for Studies in Science Education
The University
Leeds LS2 9JT.

Cheques etc should be crossed and made payable to:

The University of Leeds.

Copies of volumes 1 (reprinted) and 3 are still available, price £2.00 (\$6.50) and £3.00 (\$8.00) respectively.

14.9 Chemical Education in Europe ISBN 0 85186 859X. Edited by P J Farago, M J Frazer and S D Walker for the Chemical Society, Burlington House, London W1V 0BN, 1976.

This welcome volume complements the work on physics education in Europe, reviewed elsewhere in this newsletter, and it draws attention to the growing body of interest in modern European science education and the establishment of intercommunications between centres of interest.

The present volume extends to some 345 pages and is broadly divided into two main parts. Part 1 contains country papers about chemical education, at both secondary and tertiary levels, as follows:

1. Chemical Education in Europe – A General Survey by M J Frazer, UK.
2. Chemistry – Its Relationship to Other Sciences and Modern Techniques by J Benard, France.
3. Chemistry in Italian Universities by G Illuminati, Italy.
4. Why International Collaboration is Vital to Success by A R Katritzky, UK.
5. Education of Secondary Level Chemistry Teachers – Problems and Prospects by I A Kornhauser, Yugoslavia.
6. The French Educational System and the Teaching of Chemistry by M Laffitte, France.
7. The Training of Chemists at Tertiary Level in France by M Magat, France.
8. Chemical Education in Denmark by G M Nord, Denmark.
9. Student Exchanges with West Germany by J R H Ross, UK.
10. Secondary Level Chemical Education by J J Thompson, UK.
11. Teaching Chemistry in Poland by T Urbanski, Poland.
12. Chemical Education in The Netherlands by N H Velthorst, Netherlands.
13. The East European Countries – A Personal View from America by J H Wotiz, USA.

Part 2 of the volume consists of a general survey of particular aspects of chemical education which have profuse illustrations and detailed statistics. The three main parts of the survey consist of:

1. The Education Systems.
2. The Secondary School Level.
3. The University Level.

This particular aspect of the book was compiled by M J Frazer and S D Walker. It will be apparent that the range and scope of this present volume is both wide and detailed, and together with the statistical data and other information, which appears in many cases for the first time, the book will be of great interest to all students of science education in Europe.

OVERSEAS AND INTERNATIONAL ACTIVITIES

15. TWENTY YEARS OF SCIENCE AND MATHEMATICS CURRICULUM DEVELOPMENT (1956-1976):

The Tenth Report of the International Clearinghouse on Science and Mathematics Curriculum Developments.

This 540 page report contains detailed information on the major current science and mathematics curriculum projects taking place all over the world. The report on each project includes a key for quick reference. In addition, each project director has given a short report highlighting the main features and accomplishments of the project.

The volume contains a twenty-year cumulative directory to all projects that have appeared in **Reports of The International Clearinghouse** from 1956-1976.

Copies of the **tenth** report are available, price \$10.00 (payable to the University of Maryland), from: The International Clearinghouse, Science Teaching Centre, University of Maryland, College Park, Maryland 20742, USA.

Copies of the **seventh** and **eighth** reports (price \$2.00) and of the **ninth** report (price \$5.00) are still available, from the same address.

16. OUT-OF-SCHOOL SCIENCE ACTIVITIES IN ISRAEL (from papers given by A Blum and N Maoz at the Annual Meeting of The Association for Science Education, Leicester, January 1977)

Out-of-school science activities in Israel can be divided into six major groups:

1. Science clubs for elementary school children
2. Agricultural studies clubs for elementary school children
3. Science clubs and fairs for secondary school students
4. Field study centres
5. Science youth magazines
6. Educational television.

Science clubs for elementary school children

Science clubs for pupils aged 11-15 are usually organized by science teachers, but their activities are fully extra-curricular. About 350 clubs are active and cover approximately 30% of elementary schools. More than 100 clubs are based on schools in culturally deprived areas. In some cities central clubs meet at science education centres run by the municipalities and the science inspectorate. Science clubs are encouraged to exchange ideas by publications, mutual visits and regional meetings.

Agricultural studies clubs

Parallel to the science clubs, many schools and municipalities organize agricultural studies clubs. Some of them emphasize rural studies projects, often in plant propagation, others do more experimental work, eg applied genetics, involving plants and animals. Agricultural studies clubs meet in elementary or junior secondary schools or on municipal school-farms and, once per year, in a national 'jamboree'. The clubs tend to develop also social activities and receive a periodical, with many popular scientific articles.

Science clubs and fairs for secondary school students

Extra-curricular science activities for secondary school students are organized mainly by universities and research institutes in particular the Weizmann Institute of Science. Beginning in 1964 with a summer science camp, it has now expanded to include more than 20 science clubs on campus; 10 clubs elsewhere in the country; 5 summer science camps; a science fair, a mathematics olympiad, a one-to-one tutoring project for underprivileged youngsters and a science experiment bank.

Field study centres

15 field study centres are spread throughout the country. Most of them are run by the Society for the Protection of Nature in Israel and are subsidized by the Ministry of Education and Culture. High school classes and youth groups, as well as students from colleges of education, attend seminars of 4-6 days on specific subjects. Courses are also given to youth instructors, teachers or other groups interested in specific topics, related to the natural values, scenery and historical sites of the region. Centre staff guide tours of children aged 13-14 or adults interested to study the area. During vacations the centres accommodate youths, adults and whole families for weeks of study.

Science youth magazines

Popular scientific magazines, especially written for youth and children, are relatively wide spread in Israel. Magazines are a relatively cheap way of out-of-school education for those interested in science and technology. They are produced in Hebrew and are subsidized.

'Lada'at' (= 'to know') is a monthly sponsored by the Science Council, the Science Teaching Centre and the Ministry of Education. It is written for students aged 10-16 and published in 10,000 copies. Most of them are sold through direct subscription and over the counter, rather than through schools.

The Society for the Protection of Nature publishes not less than three monthly magazines on topics of interest in science, geography and history - for different age groups: 'Pashosh' (= 'warbler', for primary school children), 'Sla'itl' (= 'wheat-ear', for junior secondary age) and 'Teva ve'Arez' (= 'nature and land', for senior secondary school students and adults).

Television

Much out-of-school knowledge is disseminated by television. The Educational Television (which, in Israel preceded general television and still uses most hours of the country's single channel) broadcasts many films on scientific topics after school hours. Some popular science programmes of the general television network are put on the air during the best viewing times.

17. UNIVERSITY OF THE SOUTH PACIFIC, SCHOOL OF EDUCATION

The School of Education in Suva, Fiji, recognising the continuing need for cooperation among countries of the South Pacific in developing and evaluating the school curriculum, has recently established:

- i) a curriculum resources workshop
- ii) a curriculum resources agency.

The Curriculum Resources Workshop will act as a clearing house for regional curriculum information, having permanent and travelling displays of materials. A curriculum newsletter will be produced in conjunction with their centres in the region. The workshop will endeavour to provide resources and assistance for curriculum development and research, but will not initiate these itself.

The Curriculum Resources Agency will provide curriculum materials to countries in the region. These will be, in the first instance, reprints of written materials, and copies of sound tapes and slides, produced by the UNDP/UNESCO curriculum development project based at the school of Education from 1970-75. Later, revisions and new materials produced by curriculum development workshops will become more frequent.

The workshop and agency will have one full-time organiser, Mrs Parvati Narain; the professional staff of the school and Institute of Education will be closely involved in the work of both departments.

18. SOUTH PACIFIC MATHEMATICS AND LOGIC COMPETITION

Regional mathematical competitions, sometimes called olympiads, are being held in an increasing number of regions. A competition in mathematics and logic has been run for several years by the University of Technology, Papua New Guinea, for schools in the South Pacific region. The 1977 competition is being jointly administered by the University of Technology, and by the Institute of Education of the University of the South Pacific. It will take place in May 1977, and will be available for schools in countries throughout the Pacific region.

Further information, and sample papers, may be obtained from:-

Mr Colin Meek
Mathematics Education Centre
University of Technology
PO Box 793
Lae
Papua New Guinea

Mr Peter Sanders
School of Education
University of the South Pacific
PO Box 1168
Suva
Fiji.

19. FIELD STUDY CENTRES IN SRI LANKA

The reforms initiated by the Ministry of Education in Sri Lanka in 1972 laid emphasis on the child gaining knowledge of his environment through active investigations. On the advice of John Bowles, Aid to Commonwealth Teaching of Science (ACTS) consultant to the Ministry, planning began in 1975 on a network of residential Field Study Centres, at which teachers would be able to acquire the skills and knowledge necessary to work out of doors.

The first centre to come into operation is on the campus of the Peradeniya Teachers College in Kandy. It has a laboratory, workshop, small library, sitting area and dining room as well as dormitories which can accommodate a mixed party of up to 25 teachers.

Under Voluntary Service Overseas (VSO), two wardens have been working for eighteen months to set up the field centre. In January 1977 they were joined by two experienced Sri Lankan teachers, who have been seconded to act as associate wardens of this centre.

Although the centre is well equipped, with books and apparatus from Britain supplementing local purchases by the Ministry, the emphasis in the practical work is on simple experiments which can be performed with improvised apparatus.

Work at the centres will not be confined to outdoor biology and ecology. They will be resource centres for teachers, focuses of local curriculum development, at which teachers will be able to make a contribution to the pool of skills and knowledge, as well as receiving some instruction. Eventually it is hoped that there will be a number of study centres within reach of every teacher on the island.

20. ALECSO CONFERENCE ON CHEMISTRY EDUCATION

ALECSO held a conference in Alexandria in November 1976 on THE IMPROVEMENT OF CHEMISTRY EDUCATION IN THE ARAB REGION. There were thirty-one participants from the Region from Egypt, Libya, Iraq, PDR Yemen, Tunisia, Bahrain, Somalia, Sudan, Yemen Arab Republic, Kuwait, Qatar, Syria and Jordan.

The conference concentrated on senior school work.

Guest speakers via UNESCO/IUPAC and UNESCO/FECS included Professor M J Frazer (University of East Anglia) and Dr D J Waddington (University of York), who talked on *Current Trends in Chemical Education and Modern Chemistry Curricula*.

The conference took the form of a few plenary talks (eg Frazer and Waddington) and the discussions. Final recommendations included establishment of a Curriculum Centre to concentrate resources in the Arab countries, the improvement of the status of teachers, improvement in teacher-training, curriculum reform, writing of new text-books, improvement of teaching aids.

Copies of the papers are due to be published by ALECSO (Cairo office). They include:

- Modern Chemistry Curricula — D J Waddington
- Chemistry and Related Applied Science — J N Lazonby
- Chemistry and the Environment — J A Douek
- Trends in Chemical Education — M J Frazer.

21. REGIONAL CONFERENCE ON UNIVERSITY PHYSICS EDUCATION, PENANG, MALAYSIA, 16-21 May, 1977

This Conference, the first of its kind in the Far East, is intended to bring about a closer understanding of the problems associated with physics education in the Universities of this region. Based on the ideas and recommendations of the International Conference on Physics Education, Edinburgh 1975, this Conference will attempt to analyse and compare physics curricula, and prepare guide lines for the development and improvement of physics education. This effort may assist regional institutions and organisations to evolve relevant educational programmes.

The following working papers will form the basis of discussions:

1. Current Physics Courses and Curricula in South East Asian Universities — Dr R Ratnalingam and Dr H K Fun, Malaysia
2. Design, Development and Evaluation of new Physics Courses and Curricula — Dr A V Jafri, India
3. New Approaches to Teaching and Learning of Physics — Dr R S Bhathal, Singapore
4. The Role of the Teaching Laboratory in Physics Education — Professor Rais Ahmed, India
5. Post-graduate Education of Physicists — Professor P Charoenkwan, Thailand
6. Physics and Society in South East Asia — Professor S M A Tirmizi, Pakistan

The Conference will be held at the School of Physics, University of Science of Malaysia, Minden, Penang. All conference proceedings and reports will be in English.

All correspondence should be addressed to Professor Chatar Singh, Chairman, Organising Committee, Regional Conference on University Physics Education, School of Physics, University of Science of Malaysia, Minden, Penang, Malaysia. Cable: UNISAINS.

22. EUROPHYSICS EDUCATION NEWS

The Newsletter of the Advisory Committee on Physics Education of the European Physical Society published in March 1977 is entirely concerned with reports about Physics Education which were presented at a meeting of the Advisory Committee on Physics Education at Leipzig on 5 April 1976.

The following articles appear in the Newsletter and further information about particular topics will be available from the individual authors as follows:

Title	Author
1. Physics Teaching at Secondary School Level in Bulgaria	Professor A Raev Faculty of Physics Boul A. Ivanov 5 SOFIA 26 Bulgaria
2. Physics Education in Czechoslovakia	R N Dr M Chytilova Bayerova 2 60200 BRNO Czechoslovakia
3. Report on Physics in Denmark	Professor P Thomsen Royal Danish School of Educational Studies Department of Physics Emdrupvej 115B DK2400 KOPENHAGEN Denmark
4. The Teaching of Physics at Secondary School Level in France	Professor G Aubert CNRS Laboratoire de Magnetisme BP No 166 Centre de Tri F - GRENOBLE - Cedex France
5. Physics Education in the School System of the German Democratic Republic	Professor J Auth Humboldt Universität Unter den Linden 6 DDR 106 BERLIN
6. The Teaching of Physics at Secondary School Level in Greece	Dr D Sotiriou Hellenic Physical Society 6 Grivaion Street GR 144 ATHENS Greece
7. Physics Curriculum for Dutch Pupils from 12 to 18 years of age by Dr H C Kramers and Dr P A C von Viers	Dr H C Kramers Kamerlingh Onnes Laboratorium Rijksuniversiteit LEIDEN NIEUWSTEEG 18 NL LEIDEN
8. Physics Education in Norwegian Secondary Schools	Dr K J Kneutsen Granliveien 24 Ugla N-7000 TRONDHEIM Norway
9. Physics Teaching at High School Level in Romania	Dr S Rapeanu State Committee for Nuclear Energy PO Box 4614 R-BUCHAREST Romania
10. Physics Teaching Primary and Secondary Education in Sweden	Professor L Samuelsson Department of Physics Linköping University S58183 LINKÖPING Sweden

Title	Author
11. Physics Teaching at the Secondary Level in Switzerland	Professor D Brinkmann Physik Institut Universität Zürich Schonberggasse 9 CH 8001 ZÜRICH
12. The Teaching of Physics at Secondary School Level in the United Kingdom	Mr M G Ebison The Institute of Physics 47 Belgrave Square LONDON SW1X 8QX
13. Physics at Secondary Schools in the USA	Dr B L Robinson UNESCO Science Sector Place de Fontenoy F 75700 PARIS
14. How to Teach Physics An Opinion of USSR scientists	Professor S Kapitza et al. Institute for Physical Problems Vorobyevskoe Shosse 2 USSR 117334 MOSCOW

The Newsletter is obtainable from the Editor, A Jenner, Institute for Theoretical Physics, Catholic University, Toernooiveld - Nijmegen, Netherlands.

23. ICPE NEWSLETTER

The International Commission on Physics Education is anxious to provide a means by which people can be informed about developments in Physics Education and which can be used as a vehicle for the general exchange of information.

The first number of a newsletter was produced in January 1977 for circulation in countries overseas. In collaboration with UNESCO, the publication will appear 3 times a year.

Contributions are welcomed, particularly from the developing countries (to include for example descriptions of projects, questions, controversial comments, information about meetings, references to local reports).

The contributions should be sent to John L Lewis, Secretary of ICPE, Malvern College, Malvern, Worcestershire, UK, or N Joel, Division of Science Teaching, UNESCO, Place de Fontenoy 75700 Paris, France.

24. THIRD INTERNATIONAL CONGRESS ON MATHEMATICAL EDUCATION (SEN 31:21)

Two documents emanating from the 3rd ICME are available, as follows:-

Part IV of the Congress programme (a list of all full members attending), now available from:

The Local Organising Committee
3rd ICME
University of Karlsruhe
Mathematisches Institut
Kaiserstrasse 12
7500 Karlsruhe
Federal Republic of Germany.

The Proceedings of the Congress will be published in May 1977. It will contain full versions of the main papers, as well as reports on the work in the sections, workshops, working groups and projects.

Available from:

Redaktion des Zentralblatts für Didaktik der Mathematik
University of Karlsruhe (West)
Hertzstrasse 16
7500 Karlsruhe
Federal Republic of Germany.

The full versions of the 13 survey-trends reports will be published, probably in late 1977, by UNESCO as Volume 4 of the series "New Trends in Mathematics Teaching". The parent body of the 4-yearly ICME is the International Commission on Mathematical Instruction (ICMI).

The address of the United Kingdom ICMI National Representative is:

Professor H B Griffiths
Department of Mathematics
The University
Southampton SO9 5NH.

25. INTERNATIONAL MATHEMATICAL OLYMPIAD (SEN 32.29)

The 19th International Mathematical Olympiad is due to take place in Belgrade, Yugoslavia, 4-5 July, 1977.

26. AFRICAN MATHEMATICS UNION (SEN 31.10.2)

The AMU was formed during the First Pan-African Congress of Mathematicians, Rabat, Morocco, July 1976. The proceedings of this Congress are now available, in two fascicules, from the Secretary-General, Professor I Khalil, Dean of the Faculty of Science, Mohammed V University, BP1014, Rabat, Morocco.

The AMU is planning to convene a Pan-African Conference on school mathematics, to take place in Yaounde, Cameroon, in March, 1978.

27. EUROPEAN STUDY GROUP: ALTERNATIVE MATHEMATICS (SEN 30.17, 32.27)

The fourth meeting of the Group took place in London from 15-17 April 1977. Participants came from Britain, France, Germany, Holland, Norway and Sweden.

The Group is concerned with problem-solving strategies in the teaching and learning of school mathematics. While developments in mathematics education in recent years are to be welcomed in general, there is a danger that a current mathematics syllabus may still be taught as a self-contained "subject", with little reference to real-life problems. The European Study Group's work deals with the use of mathematics in solving problems, and with the use of problems in the teaching of mathematics.

The next meeting of the Group will probably be early in 1978. It is hoped that a small publication will be produced in due course.

28. LOW-COST SCIENCE TEACHING EQUIPMENT - Commonwealth Regional Seminar/Workshop, Bahamas, 16-26 November 1976

The importance of science to national development has been recognised by all governments. This is evident from the worldwide trend towards developing relevant materials which are related to a child's environment. In general, the materials developed during the past two decades have tended to stress student participation and learning by doing. Consequently, they require an adequate supply of equipment for effective implementation. Yet, to date, very little progress seems to have been made in school science teaching. One of the major reasons is the non-availability, inadequacy or non-utilisation of equipment.

Hence Commonwealth governments have requested that the Commonwealth Secretariat should promote and encourage co-operative activities aimed at alleviating this handicap. In September 1975, the Secretariat published a book entitled *The Production of School Science Equipment* (see SEN 28.13.1). Besides critically reviewing developments in the field of low-cost equipment, the book provided information on agencies and programmes concerned with the design and manufacture of science teaching aides in a wide range of countries. Also included were photographs of many types of equipment for use in countries where items from the major international suppliers are unobtainable or unsuitable.

This seminar - the first of a series of such meetings on the teaching of science - was organised to complement the Commonwealth Secretariat's publishing efforts in the field of science equipment. It did not concern itself with the methods of teaching science. Instead, it emphasised the means of making the knowledge of science available to as many school pupils as possible through the local production of science teaching equipment, keeping the cost as low as possible. For this reason, the seminar included practical laboratory sessions at which participants familiarised themselves with the basic workshop techniques for the construction of some of the simple basic items of equipment which are at present imported into the various countries. Kits produced by Kenya Science Equipment Production Unit (SEPU) and the National Council of Educational Research and Training (NCERT) of India were displayed; participants were encouraged to try experiments with this equipment. Participants also produced some apparatus themselves.

Another objective of the meeting was to identify ways of encouraging regional and Commonwealth co-operation in this field, and a number of recommendations were made. A report on the workshop has been produced, giving summaries of the discussions and laboratory exercises, and information about science equipment centres in other regions. It may be purchased, price £1, from:

The next workshop in the series will take place in Dar es Salaam, Tanzania, from 20–30 September 1977.

29. UNESCO INTERNATIONAL CONGRESS: LABORATORY COURSES IN CHEMISTRY IN UNIVERSITIES – 13–17 February 1978, Perth, Western Australia

This Congress is to be held in the Sheraton Hotel, Perth, Western Australia.

Themes

1. In-service training of laboratory staff in existing institutions, and the availability and skills of technical staff attached to these laboratories.
2. The nature and purpose of laboratory teaching for service courses (medical, engineering, agriculture etc).
3. Styles of laboratory instruction suitable for students from non-technological backgrounds.
4. Progress and results from recent UNESCO Workshops on laboratory work.
5. Poster sessions on the characteristics of laboratory courses for higher than first year.
6. Evaluation of laboratory courses
 - a. student assessment.
 - b. evaluation of courses in terms of student attitude and cost-effectiveness.

The programme will be based on nine sessions including plenary lectures, short papers with pre-circulated abstracts, and group discussions which will allow full involvement of all participants.

Participants

Participation will be limited to three groups of about 30–35 each, invited from (a) developing countries (b) developed countries other than Australia (c) within Australia. There will be no registration fee for invitees.

Those interested in receiving further information should contact:

Professor D W Watts
School of Chemistry
University of Western Australia
Nedlands 6009
Western Australia.